



Dart Aerospace Ltd.
1270 Aberdeen St
Hawkesbury, ON
K6A 1K7
Canada

Tel (613) 632-5200
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(4)

D350-748-143TRN
Job Sheet 195160



Part No: D350-748-143TRN

Job Qty: 1 pcs

Part Name: Ss Crosstube Turning Detail



Part Weight: 0 lbs

Status: New

Priority: Medium

Job Created: 5/15/19

Job Tracking No:

Due Date: 5/29/19

Created By: Marie Lajeunesse

Type: Stock

Description:

Note: DWG REV A IPP REV.A NEW ISSUE - LL 12.05.08

Ship Via:

Bill of Materials

Job Routing

Op No	Operation	Qty	Start Date	Due Date	Standard		Workcenter/Supplier		DAS	Sign-off
					Setup Hrs	Run Hrs	Workcenter / Supplier	Lead Time		
100	Mori Seiki TL-40 - 1	1 pcs	5/29/19	5/29/19	7.06	2.81	Mori Seiki TL-40 - 1		66	2019-06-07
110	QC 2	1 pcs	5/29/19	5/29/19	0.00	0.00	QC 2 - 1		9-89	
							QC 2 - 12			
							QC 2 - 14			
							QC 2 - 17			
							QC 2 - 19			
							QC 2 - 2			
							QC 2 - 20			
							QC 2 - 22			
							QC 2 - 23			
							QC 2 - 25			
							QC 2 - 32			
							QC 2 - 33			
							QC 2 - 35			
							QC 2 - 39			
							QC 2 - 4			
							QC 2 - 40			
							QC 2 - 44			
							QC 2 - 45			
							QC 2 - 48			
							QC 2 - 49			
							QC 2 - 50			
							QC 2 - 51			
							QC 2 - 52			
							QC 2 - 57			
							QC 2 - 62			
							QC 2 - 63			
							QC 2 - 8		DAS	
							QC 2 - 66		66	2019-06-07
							QC 2 - 64		9-89	
							QC 2 - 65			

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				QC 2 - 5		
				QC 2 - 71		DAS
120	Mori Seiki TL-40 - 1 - B4B	1 pcs	5/29/19	0.00 2.81	Mori Seiki TL-40 - 1 - B4B	662019-06-10
130	QC 2	1 pcs	5/29/19	0.00 0.00	QC 2 - 1	9-89
				QC 2 - 12		
				QC 2 - 14		
				QC 2 - 17		
				QC 2 - 19		
				QC 2 - 2		
				QC 2 - 20		
				QC 2 - 22		
				QC 2 - 23		
				QC 2 - 25		
				QC 2 - 32		
				QC 2 - 33		
				QC 2 - 35		
				QC 2 - 39		
				QC 2 - 4		
				QC 2 - 40		
				QC 2 - 44		
				QC 2 - 45		
				QC 2 - 48		
				QC 2 - 49		
				QC 2 - 50		
				QC 2 - 51		
				QC 2 - 52		
				QC 2 - 57		
				QC 2 - 62		
				QC 2 - 63		
				QC 2 - 8		DAS
				QC 2 - 66		662019-06-10
				QC 2 - 64		9-89
				QC 2 - 65		
				QC 2 - 5		
				QC 2 - 71		
140	QC 8	1 pcs	5/29/19	0.00 0.00	QC 8 - 12	
				QC 8 - 14		
				QC 8 - 17		
				QC 8 - 20		
				QC 8 - 25		
				QC 8 - 3		
				QC 8 - 32		
				QC 8 - 33		
				QC 8 - 35		
				QC 8 - 39		
				QC 8 - 4		
				QC 8 - 44		
				QC 8 - 45		
				QC 8 - 49		
				QC 8 - 58		
				QC 8 - 8		
				QC 8 - 9		
				QC 8 - 68		DAS
				QC 8 - 67		67 19-06-12
				QC 8 - 1 (A)		9-89
				QC 8 - 47		
				QC 8 - 40		
				QC 8 - 52		
				QC 8 - 23		

150 Crosstubes - 2 - B4B	1 pcs	5/29/19	0.00 0.97	Crosstubes - 1 - B4B	
				Crosstubes - 2 - B4B	BS 9/30/2019
				Crosstubes - 3 - B4B	
				Crosstubes - 4 - B4B	
190 Packaging 3-1 - Stock - B4B 1 pcs		5/29/19	0.00 0.00	Packaging 3 - 1 - B4B	
				Packaging 3 - 2 - B4B	
				Packaging 3 - 3 - B4B	
				Packaging 3 - 4 - B4B	
				Packaging 3 - 5 - B4B	
				Packaging 3 - 6 - B4B	
				Packaging 3 - 7 - B4B	
				Packaging 3 - 8 - B4B	
				Packaging 3 - 9 - B4B	
				Packaging 3 - 10 - B4B	
				Packaging 3 - 11 - B4B	
				Packaging 3 - 12 - B4B	
				Packaging 3 - 13 - B4B	
				Packaging 3 - 14 - B4B	
				Packaging 3 - 15 - B4B	
				Packaging 3 - 16 - B4B	
				Packaging 3 - 17 - B4B	
				Packaging 3 - 18 - B4B	
				Packaging 3 - 19 - B4B	
				Packaging 3 - 20 - B4B	
				Packaging 3 - 21 - B4B	
				Packaging 3 - 22 - B4B	
				Packaging 3 - 23 - B4B	
				Packaging 3 - 24 - B4B	BS 9/30/2019
				Packaging 3 - 25 - B4B	
				Packaging 3 - 26 - B4B	
				Packaging 3 - 27 - B4B	
				Packaging 3 - 28 - B4B	
				Packaging 3 - 29 - B4B	
				Packaging 3 - 30 - B4B	
				Packaging 3 - 31 - B4B	
				Packaging 3 - 32 - B4B	
				Packaging 3 - 33 - B4B	
				Packaging 3 - 34 - B4B	
				Packaging 3 - 35 - B4B	
				Packaging 3 - 36 - B4B	
200 QC 21 - SA	1 pcs	5/29/19	0.00 0.00	QC 21 - SA - 21	BS 21 OCT 01 2019
				QC 21 - SA - 70	
				QC 21 - SA - 53	

Part Op 100 - (Mori Seiki CNC Lathe Large) 1-Cut tube on chop saw, leave extra mat'l for facing and install plugs 350-141 on both ends. 2-Face both sides of tube. 3- Turn program 02000 section on both side as per folio FB467. 4- Turn program 03000 section on both side as per folio FB467. 5- Blend transition lines only with belt sander 60 grit Folio rev: A

Dwg rev: A

110 - (QC2- Inspect parts off machine FAI/FAIB)

120 - (Mori Seiki CNC Lathe Large) 1- Turn program 04000 section on both side as per folio FB467. 2- Blend transition lines only with belt sander 60 grit 3- Scribe part # as per Dwg D350-748-143 Folio rev: A Dwg rev: A

130 - (QC2- Inspect parts off machine FAI/FAIB) PERFORME ULTRASONIC MEASUREMENT

140 - (QC8- Inspect parts - second check)

150 - (Crosstubes) 1-Grind machining marks

190 - (Identify as per dwg & Stock Location: _____) Identify and stock in kanban rack

200 - (QC21- Final Inspection - Work Order Release)

Job BOM

Part / Item	Component Name	Quantity	Operation	Container
D6021-125	Crosstube Material - 17-4Ph SS	1 pcs (1 ea)	100-Mori Seiki TL-40 - 1	F151691

Job Allocations				
Operation	Component Part	Required	Inventory	Allocated
100-Mori Selki TL-40 - 1	D6021-125	1	39	0
Part Specifications				
Specifications could not be found.				

**Container No: S188487****Part: D350 - 748 - 143TRN****Job No: 195160****Serial No/Batch: S188487****Revision: A****Inspector:****Exp Date:****Instructions:**

Dart Aerospace Ltd.
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Date: 05/07/19

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DART AEROSPACE LTD	Work Order: 195160
Description: Crosstube Assembly (AS350/355 High Fwd SS)	Part Number: D350-748-143
Inspection Dwg: D350-748-143 Rev: A	Page 1 of 2

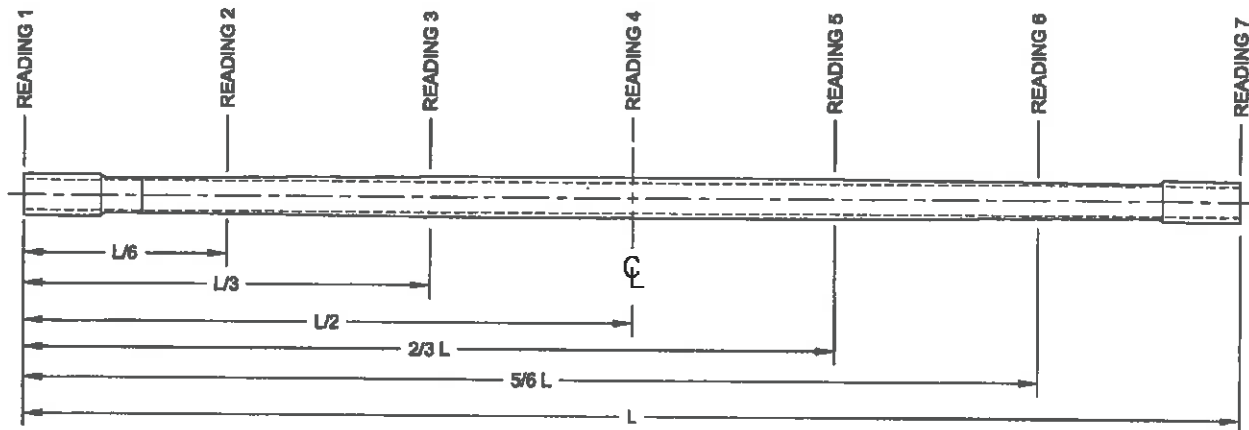
FIRST ARTICLE INSPECTION CHECKLIST

Inspection Sheet	Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
SIDE A	2.240	+/-0.005	2.240	✓		CNC-04	
	2.180	+0.005/-0.000	2.185	✓			
	2.180	+0.005/-0.000	2.184	✓			
	2.237	+0.005/-0.000	2.242	✓			
	2.272	+0.005/-0.000	2.277	✓			
	2.306	+0.005/-0.000	2.311	✓			
	2.339	+0.007/-0.000	2.346	✓			
	2.339	+0.007/-0.000	2.346	✓			
	0.062	+/-0.010	.062	✓		CNC-08	
	5.25	+/-0.060	5.264	✓		"	
	R0.063	+/-0.010	.063	✓		RG	
	R0.50	+/-0.030	.500	✓		"	
SIDE B	2.240	+/-0.005	2.240	✓		CNC-04	
	2.180	+0.005/-0.000	2.185	✓			
	2.180	+0.005/-0.000	2.185	✓			
	2.237	+0.005/-0.000	2.242	✓			
	2.272	+0.005/-0.000	2.277	✓			
	2.306	+0.005/-0.000	2.311	✓			
	2.339	+0.007/-0.000	2.345	✓			
	2.339	+0.007/-0.000	2.346	✓			
	0.062	+/-0.010	.062	✓		CNC-08	
	5.25	+/-0.060	5.266	✓		"	
	R0.063	+/-0.010	.063	✓		RG	
	R0.50	+/-0.030	.500	✓		"	
	112.27	+/-0.060	112.27	✓		Tape	

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DART AEROSPACE LTD	Work Order: 195160
Description: Crosstube Assembly (AS350/355 High Fwd SS)	Part Number: D350-748-143
Inspection Dwg: D350-748-143 Rev: A	Page 2 of 2

WALL THICKNESS MEASUREMENT



Location	WALL THICKNESS MEASUREMENT (IN)				Deviation Δw (max-min)	TOLERANCE
	w1	w2	w3	w4		
READING 1 L= 0"	.141	.144	.147	.136	.011	0.030"
READING 2 L= 18.71	.149	.146	.145	.146	.004	
READING 3 L= 37.42	.197	.197	.193	.194	.004	
READING 4 L= 56.14	.195	.196	.195	.198	.003	
READING 5 L= 74.85	.198	.187	.189	.204	.017	
READING 6 L= 93.56	.147	.146	.145	.154	.009	
READING 7 L= 112.27	.141	.145	.141	.135	.010	

Calibration Result

Actual Block Thickness: 100-200

Sitescan 250 Measured Thickness: 100-200

Measured by: DAS 66		Audited by: DAS 67 9-89		Preliminary Approval:	
Date: 2019-06-10 9-89		Date: 19-06-12		Date:	
Rev	Date	Change		Revised by	Approved
A	15.09.09	New Issue (P/O D350-748-103)		KJ AK	AA

Item	Qty	Part Number	Description
	-143		
	X	D350-748-143	CROSSTUBE ASSEMBLY (AS 350355 HI PWD)
1	1	D8021-125	CROSSTUBE
2	2	D3502-1	SUPPORT
3	2	D5123-7	CLAMP CUSHION
4	1	AETC-1032	INSERT
5	2	M821820-20	CLAMP (PER DART SPEC. M-MS21920-20-21-22)
		OR MS21920-21-22	
6	1	NAS11450363R	WASHER (OR AN650C10)
7	1	NAS1635-3-8	SCREW (OR MS1938-43)
8	AIR	PROSEAL 880 B-2	SEALANT, AMS-S-8802 CLASS B-2

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D8021-125 (17-4PH)
- 2) FINISH: FINISHED LENGTH AFTER TURNING = 112.270±0.06 (AFTER BENDING/TRIMMING = 110.27 REF)
- 3) FINISH: PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
- 4) TOLERANCE: PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 5) WALL THICKNESS ECCENTRICITY PER DART QSI 038 7.2
- 6) MIN. ALLOWABLE WALL IS -0.020 FROM NOMINAL
- 7) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 8) BREAK SHARP EDGES: 0.006 TO 0.010 MAX.
- 9) IDENTIFICATION: DART PART NUMBER D350-748-143 AND BATCH NUMBER ON INSIDE OF CUFF
- 10) WEIGHT: 30.45 lbs
- 11) PART IS SYMMETRIC ABOUT CENTERLINE. EXCEPT FOR 20.290 HOLE.
- 12) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLEND OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE. WHEN DRILLING HOLES EXTREME CARE MUST BE TAKEN AND CAREFUL DEBURRING PERFORMED TO ENSURE A CLEAN HOLE WITH NO CRACKING/CHIPPING/GROOVES.
- 13) TURNING
- 14) BLEND OUT ALL EDGES FROM MACHINING LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH. NOTE: ALL HOLES ARE DRILLED AFTER BENDING.
- 15) BENDING
- 16) BEND PROGRESSIVELY WITH A MINIMUM OF 7 PASSES PER SIDE. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D. ON TOP HALF OF BEND, AND 8% ON BOTTOM HALF OF BEND.
- 17) MAX AMPLITUDE OF RIPPLING ALONG BENT PORTION OF THE TUBE IS 0.030 (ZN A1-3)
- 18) MAY BE NO LARGER THAN 0.38 (ZN C1-3).
- 19) ASSEMBLY
- 20) TO INSTALL D3502-1 SUPPORT: ABRASIVE MATTING SURFACE OF SUPPORT AND CROSSTUBE WITH 180-GRIT SANDPAPER AND REMOVE RESIDUE WITH MEK (OR EQUIVALENT). APPLY A 0.02" TO 0.05" THICK LAYER OF PROSEAL 880 CLASS B-2 (OR AMS-S-8802 CLASS B-2) SEALANT TO MATTING SURFACE OF SUPPORT.
- 21) TORQUE CLAMPS 60 TO 80 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER PROSEAL 880 SEALANT HAS CURED FOR 72 HOURS.

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WORK ORDER
NO. 195162 MJS
1905-15

UNDER REVIEW

01/15/12/14
CFF W. 561

DEO ATTACHED

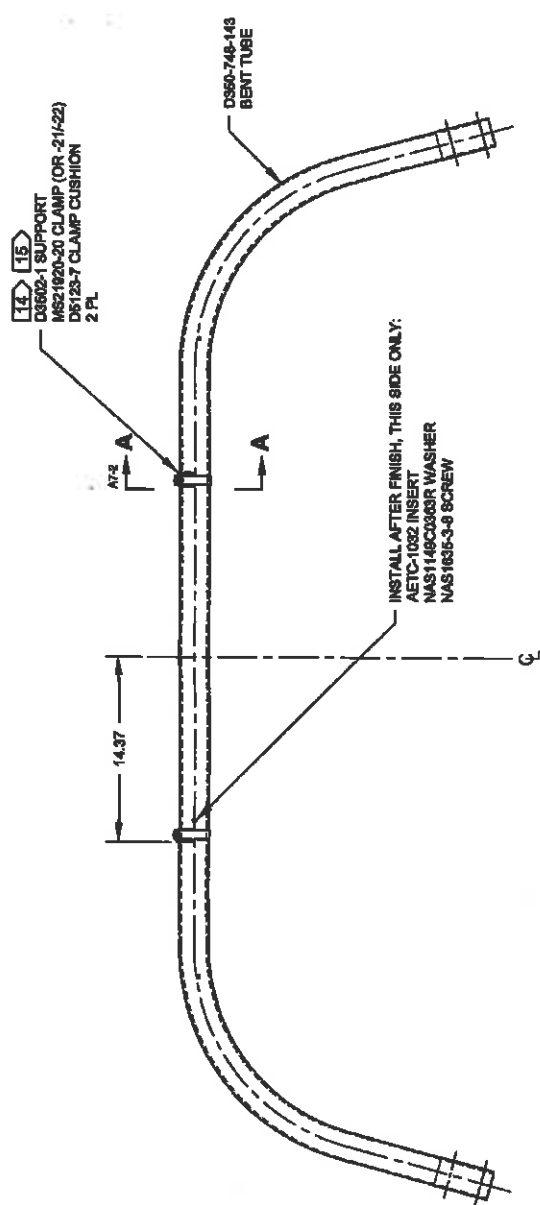
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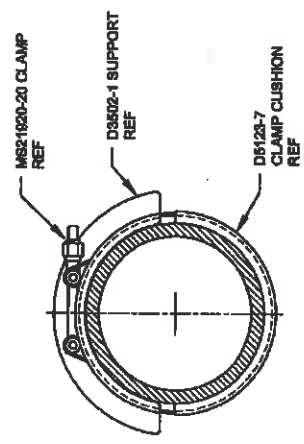
01/15/12/14

A	NEW ISSUE	DESCRIPTION	CP	BY	DATE
DESIGN					
DRAWN					
CHECKED					
MFG. APPR.					
DE APPR.					
DATE	15.01.21				
DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA					
DRAWING NO. D350-748-143					
REV. A					
SHEET 1 OF 4					
TITLE					
CROSSTUBE (AS 350355 HI PWD)					
NTS					
DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA					

1 2 3 4 5 6 7 8



**D350-748-143
ASSEMBLY DETAIL**



SECTION A-A
D-2
SCALE 6X

UNDER REVIEW
15/07/25
9/2/25

DEO ATTACHED

RELEASED

2015 MAR 18
9/2 ECU-15-547

DESIGN	00	DART AEROSPACE LTD	REV. A
DRAWN	00	HAWKESBURY, ONTARIO, CANADA	
CHECKED	00	DRAWING NO. D350-748-143	SHEET 2 OF 4
INFO. APPL.	00	TITLE	SCALE
APPROVED	00	CROSSTUBE (AS 350/355 HI FWD)	NTS
DATE	15.01.21		

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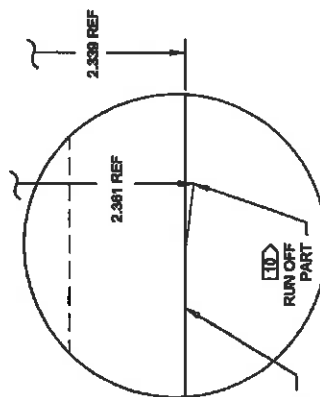
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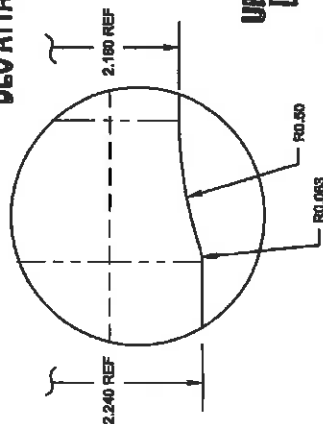
2015 MAR 18

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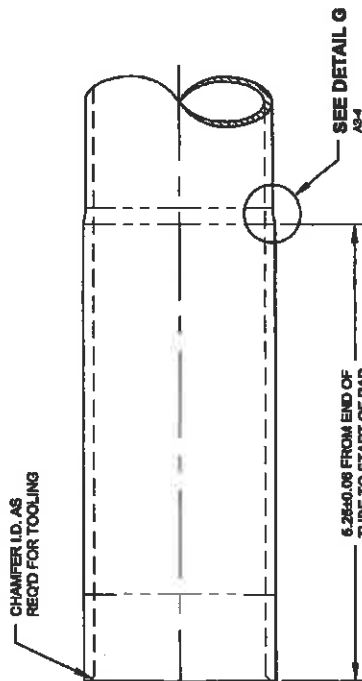


DETAIL F:
TOOL RUN-OFF
NOT TO SCALE

UNDER REVIEW



DETAIL G:
CUFF TRANSITION AS-1
NOT TO SCALE



DETAIL E:
CROSSTUBE CUFF
SCALE 3X

DESIGN	40	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA DRAWING NO. D350-748-143 TITLE CROSSTUBE (AS 350/385 HI FWD) SCALE NTS COPYRIGHT © 1985 BY DART AEROSPACE LTD THIS DOCUMENT IS THE PROPERTY OF DART AEROSPACE LTD. IT IS TO BE USED FOR THE PURPOSES SPECIFIED AND IS NOT TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM, WITHOUT THE WRITTEN PERMISSION OF DART AEROSPACE LTD.	
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DATE	15.01.21	DIS. APPR.	<i>[Signature]</i>

DRAWING NO. D350-748-143	TITLE CROSSTUBE	REV. A	DART AEROSPACE LTD ENGINEERING ORDER		D.E.O. NO. D350-748-143-A-1	SHEET NO. SHEET 1 OF 1	SCALE NTS
DRAWN 90	CHECKED ADS		MFG. APPR. <i>[Signature]</i>	APPROVED <i>[Signature]</i>		DE APPR. <i>[Signature]</i>	
DATE 15.11.18	DATE 15.11.18		DATE 16.02.19	DATE FEB 19 2016		DATE 2016.02.19	

AMEND NOTE 2 (SHEET 1) AS FOLLOWS:

- 2) FINISH: PREPARE SURFACE PER DART QSI 005 4.1.4
 PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
 PAINT OUTSIDE PER DART QSI 005 4.2
 OR
 POWDER COAT WHITE (4.3.5.2) PER DART QSI 005 4.3

RELEASED
 2016-02-26
 EN 16-534



Entered: _____ Date: _____

WORK ORDER NON-CONFORMANCE / ROUTE UPDATE

Route update only

NCR No. _____

DISPOSITION		DEPARTMENT/PROCESS			
Job: _____		Skid-tube	Cross tube	Eng. (Non-AW)	Engineering
Part No. _____		Machining	Small Fab	Prod. Eng. Coord.	Water Jet
		Large Fab	Finishing	Rec/Store/Packaging	Supplier
Date: _____		Sequence #: _____		QTY Affected: _____	
Description Work Order Deviation		Disposition			
Root Cause		FAULT CATEGORY			
Operator	Pressure/Forced	Contamination	Power Loss/Surge	Positioned Wrong	
Manufacturing Process	Bending	Misaligned/off center	Folio/Program	Outside Tolerance	
Equip/Tooling	Crushing	BOM/Route	Grain Direction	Drawing	
Handling/Preservation	Cracks	Broken/Damage/Defect	Weld	Finish	
Material	Crimp/Kink/Ripple/Wave/Twist	Incomplete/Unclear Instructions	Wrong Stock Pulled	Part Lost/Missing	
Product Improvement	Marks/Chatter	Drill Holes	Out of Sequence	Misread	
Process Improvement	Mislabeled	Fit/Function	Off-set/Set-up		
Human Factors	Other/Details:				
Completed By		Lead hand / Supervisor			
QC / QA Coordinator					